estimated noiseless output;

subtracting said estimated noiseless output from said first data sequence corrupted by noise to generate a difference signal; and

computing an average energy estimation from said difference signal.

11. (AMENDED) The method <u>of</u> filtering a digital television transmission according to claim 1 wherein said first transmitted data sequence is encrypted.

13. (AMENDED) An <u>apparatus</u> [system] for filtering a digital television signal comprising:

a generator for generating first data sequences at a transmitter and the transmitter for broadcasting said digital television signal including said first data sequences in a broadcast channel;

a receiver for receiving the digital television signal, said receiver including;

a channel estimator for comparing said first data sequences to second data sequences, said second data sequences being locally generated, and for providing an estimate of the impulse response of said channel at an output of said channel estimator; and

an adaptive equalizer filter including an input for receiving said digital television signal, and filter taps in communication with said output of said channel estimator such that filter coefficients of said adaptive filter are adjusted according to said estimate of said impulse response of said channel.

Please add the following new claims:

<u>25. (NEW) A method of processing a digital television stream including a packetized first data sequence transmitted through a channel comprising the steps of:</u>

<u>receiving said digital television stream at a receiver and recovering said first data</u>

sequence from said digital television stream;

comparing said first data sequence to a second data sequence, said second data sequence being locally generated, to provide a channel estimate;

applying said received television stream to an adaptive filter;

adaptively adjusting filter coefficients of said adaptive filter according to said channel estimate such that undesirable channel effects upon said received television stream are filtered from said received television stream.

26. (NEW) The method of processing a digital television stream according to claim 25 wherein the digital television stream is a high definition television (HDTV) signal and said first data sequence is transmitted in a private channel of an MPEG (Motion Picture Expert Group) data channel.

27. (NEW) The method of processing a digital television stream according to claim 25 wherein said first data sequence is corrupted by noise after passage through said channel to said receiver.

28. (NEW) The method of processing a digital television stream to according to claim 27 wherein said first data sequence corrupted by noise is used to compute an estimate of channel frequency response.

29. (NEW) The method of processing a digital television stream according to claim 28 wherein the step of comparing comprises the steps of:

computing a Fast Fourier Transform (FFT) of said first data sequence corrupted by noise;

computing a FFT of said second data sequence; and

dividing the FFT of said first data sequence by the FFT of said second data sequence to provide said estimate of channel frequency response.

30. (NEW) The method of processing a digital television stream according to claim 29 further comprising the step of determining said channel impulse response using a quotient from said step of dividing.

31. (NEW) The method of processing a digital television stream according to claim 30 wherein the step of determining said channel impulse response comprises the step of windowing an Inverse FFT (IFFT) of said quotient of the dividing step.

32. (NEW) The method of processing a digital television stream according to claim 31 further comprising the step of estimating noise variance by computing average energy of channel estimation error sequence as a function of said windowed IFFT, said first data sequence corrupted by noise and said second data sequence.

33. (NEW) The method of processing a digital television stream according to claim 32 wherein said step of estimating noise variance comprises the steps of:

convolving said windowed IFFT with said second data sequence to generate an estimated noiseless output;

subtracting said estimated noiseless output from said first data sequence corrupted by noise to generate a difference signal; and

computing an average energy estimation from said difference signal.

34. (NEW) The method of processing a digital television stream according to claim 33 wherein said channel impulse response and the estimate of noise variance are used to compute optimum equalizer coefficients for the step of adaptively adjusting filter coefficients.

35. (NEW) The method processing a digital television stream according to claim 25 wherein said first data sequence is encrypted.

36. (NEW) The method of processing a digital television stream according to claim 25 wherein said first data sequence is transmitted in a dynamic or rolling frame/packet structure.

37. (NEW) A method of transmitting a digital television stream through a channel comprising the steps of:

generating a packetized first data sequence to be compared in a receiver coupled to said channel to a second data sequence, said second data sequence being locally generated, to provide a channel estimate for adaptively adjusting filter coefficients of an adaptive filter such that undesirable channel effects upon a television stream received from said channel are filtered from said received television stream; and

transmitting through said channel, a digital television stream including said packetized first data sequence.

38. (NEW) The method of transmitting a digital television stream according to claim 37 wherein the digital television signal is a high definition television (HDTV) signal and said first data sequence is transmitted in a private channel of an MPEG (Motion Picture Expert Group) data channel.

39. (NEW) The method of transmitting a digital television stream according to claim 37 wherein said first data sequence is corrupted by noise after passage through said channel to said receiver.

40. (NEW) The method of transmitting a digital television stream to according to claim 39 wherein said first data sequence corrupted by noise is used to compute an estimate of channel frequency response.

41. (NEW) The method of transmitting a digital television stream according to claim 40 wherein the step of comparing comprises the steps of:

computing a Fast Fourier Transform (FFT) of said first data sequence corrupted by noise;

computing a FFT of said second data sequence; and

dividing the FFT of said first data sequence by the FFT of said second data sequence to provide said estimate of channel frequency response.

42. (NEW) The method of transmitting a digital television stream according to claim 41 further comprising the step of determining said channel impulse response using a quotient from said step of dividing.

43. (NEW) The method of transmitting a digital television steam according to claim 42 wherein the step of determining said channel impulse response comprises the step of windowing an Inverse FFT (IFFT) of said quotient of the dividing step.

44. (NEW) The method of transmitting a digital television stream according to claim 43 further comprising the step of estimating noise variance by computing average energy of channel estimation error sequence as a function of said windowed IFFT, said first data sequence corrupted by noise and said second data sequence.

45. (NEW) The method of transmitting a digital television stream according to claim 44 wherein said step of estimating noise variance comprises the steps of:

convolving said windowed IFFT with said second data sequence to generate an estimated noiseless output;

subtracting said estimated noiseless output from said first data sequence corrupted by noise to generate a difference signal; and

computing an average energy estimation from said difference signal.

46. (NEW) The method of transmitting a digital television stream according to claim 45 wherein said channel impulse response and the estimate of noise variance are used to compute optimum equalizer coefficients for the step of adaptively adjusting filter coefficients.

47. (NEW) The method of transmitting a digital television stream according to claim 37 wherein said first transmitted data sequence is encrypted.

48. (NEW) The method of transmitting a digital television stream according to claim 37 wherein said first data sequence is transmitted in a dynamic or rolling frame/packet structure.

49. (NEW) An apparatus for processing a digital television signal including first data sequences transmitted in a broadcast channel comprising:

a receiver for receiving said digital television signal, said receiver including;

a channel estimator for comparing said first data sequences to second data sequences, said second data sequences being locally generated, and for providing an estimate of the impulse response of said channel at an output of said channel estimator; and

an adaptive equalizer filter including an input for receiving said digital television signal, and filter taps in communication with said output of said channel estimator such that filter coefficients of said adaptive filter are adjusted according to said estimate of said impulse response of said channel.

50. (NEW) The apparatus for processing a digital television signal according to claim 49 wherein the digital television signal comprises a high definition television (HDTV) signal and said first data sequences are transmitted in a private data stream of an MPEG (Motion Picture Expert Group) channel.

51. (NEW) The apparatus for processing a digital television signal according to claim 49 wherein said first data sequences are corrupted by noise after passage through said channel to said receiver.

52. (NEW) The apparatus for processing a digital television signal according to claim 51 wherein said first data sequences corrupted by noise are used to compute an estimate of the frequency response of said channel.

53. (NEW) The apparatus for processing a digital television transmission according to claim 52 wherein said channel estimator comprises:

a first Fast Fourier Transform (FFT) processor for computing a FFT of said first data sequences corrupted by noise;

a generator for generating the second data sequences at the receiver;

a second FFT processor for computing a FFT of said second data sequences; and

a divider for dividing an output of said first FFT processor by an output of said second FFT processor to produce said estimate of channel frequency response.

54. (NEW) The apparatus for processing a digital television signal according to claim 53 further comprising an estimator for estimating the channel impulse response using a quotient from said divider.

55. (NEW) The apparatus for processing a digital television signal according to claim 54 wherein said estimator includes a processor for windowing an Inverse FFT (IFFT) of the quotient of the divider.

56. (NEW) The apparatus for processing a digital television signal according to claim 55 further comprising a channel estimator configured to provide an estimate of noise variance by computing average energy of channel estimation error sequence as a function of said windowed IFFT, said first data sequences corrupted by noise and said second data sequences.

57. (NEW) The apparatus for processing a digital television signal according to claim 56 wherein said noise variance estimator comprises:

a convolver for convolving said windowed IFFT with said second data sequences to generate an estimated noiseless output;

a subtractor for subtracting said estimated noiseless output from said first data

sequences corrupted by noise to generate a difference signal; and

a processor for computing an average energy estimation from said difference signal.

58. (NEW) The apparatus for processing a digital television signal according to claim 57 wherein said channel impulse response and said estimate of noise variance are used to compute optimum equalizer coefficients for adaptively adjusting filter coefficients.

59. (NEW) The apparatus for processing a digital television signal according to claim 49 wherein said first data sequences are encrypted.

60. (NEW) The apparatus for processing a digital television signal according to claim 49 wherein said first data sequences are transmitted in a dynamic or rolling frame/packet structure.

61. (NEW) An apparatus for transmitting a digital television signal through a channel comprising:

a generator for generating first data sequences to be compared in a receiver to second data sequences, said second data sequences being locally generated, to provide an estimate of the impulse response of said channel for adjusting filter coefficients of an adaptive filter; and

a transmitter for transmitting a digital television signal including said first data sequences through said channel.

62. (NEW) The apparatus for transmitting a digital television signal according to claim 61 wherein the digital television signal comprises a high definition television (HDTV) signal and said first data sequences are transmitted in a private data stream of an MPEG (Motion Picture Expert Group) channel.

63. (NEW) The apparatus for transmitting a digital television signal according to claim 62 wherein said first data sequences are corrupted by noise after passage through the channel to said receiver.

64. (NEW) The apparatus for transmitting a digital television signal according to claim 63 wherein said first data sequences corrupted by noise are used to compute an estimate of the frequency response of said channel.

65. (NEW) The apparatus for transmitting a digital television transmission according to claim 64 wherein said channel estimator comprises:

a first Fast Fourier Transform (FFT) processor for computing a FFT of said first data sequences corrupted by noise;

a generator for generating said second data sequences at the receiver;

a second FFT processor for computing a FFT of said second data sequences; and

a divider for dividing an output of said first FFT processor by an output of said second FFT processor to produce said estimate of channel frequency response.

66. (NEW) The apparatus for transmitting a digital television signal according to claim 65 further comprising an estimator for estimating the channel impulse response using a quotient from said divider.

67. (NEW) The apparatus for transmitting a digital television signal according to claim 66 wherein said estimator includes a processor for windowing an Inverse FFT (IFFT) of the quotient of the divider.

68. (NEW) The apparatus for transmitting a digital television signal according to claim 67 further comprising a channel estimator configured to provide an estimate of noise variance by computing average energy of channel estimation error sequence as a function of said windowed IFFT, said first data sequences corrupted by noise and said second data sequences.

69. (NEW) The apparatus for transmitting a digital television signal according to claim 68 wherein said noise variance estimator comprises:

a convolver for convolving said windowed IFFT with said second data sequences to generate an estimated noiseless output;

a subtractor for subtracting said estimated noiseless output from said first data sequences corrupted by noise to generate a difference signal; and

a processor for computing an average energy estimation from said difference signal.

70. (NEW) The apparatus for transmitting a digital television signal according to claim 68 wherein said channel impulse response and said estimate of noise variance are used to compute optimum equalizer coefficients for adaptively adjusting filter coefficients.

71. (NEW) The apparatus for transmitting a digital television signal according to claim 61 wherein said first data sequences are encrypted.

72. (NEW) The apparatus for transmitting a digital television signal according to claim 61 wherein said first data sequences are transmitted in a dynamic or rolling frame/packet structure.

73. (NEW) A method of processing a digital stream including packetized video data and a packetized first data sequence communicated through a channel comprising the steps of:

receiving said digital stream from said channel and recovering said first data sequence from said digital stream;

comparing said first data sequence to a second data sequence, said second data sequence being locally generated, to provide a channel estimate;

applying said received digital stream to an adaptive filter;

adaptively adjusting filter coefficients of said adaptive filter according to said channel estimate such that undesirable channel effects upon said received digital stream are filtered from said received digital stream.

74. (NEW) A method of forming a digital stream to be communicated through a channel comprising the steps of:

generating packetized video data;

generating a packetized first data sequence to be compared in a receiver coupled to said channel to a second data sequence, said second data sequence being locally generated, to provide a channel estimate for adaptively adjusting filter coefficients of an adaptive filter such that undesirable channel effects upon a digital stream received from said channel are filtered from said received digital stream; and

coupling said packetized video data and said packetized first data sequence to said channel.

75. (NEW) An apparatus for processing a digital signal including a digital video stream comprising first data sequences communicated through a channel comprising:

a receiver for receiving said digital signal, said receiver including;

a channel estimator for comparing said first data sequences to second data sequences, said second data sequences being locally generated, and for providing an estimate of

the impulse response of said channel at an output of said channel estimator; and

an adaptive equalizer filter including an input for receiving said digital signal, and filter taps in communication with said output of said channel estimator such that filter coefficients of said adaptive filter are adjusted according to said estimate of said impulse response of said channel.

76. (NEW) An apparatus for forming a digital signal to be communicated through a channel comprising:

a generator for generating first data sequences to be compared in a receiver coupled said channel to second data sequences, said second data sequences being locally generated, to provide an estimate of the impulse response of said channel for adjusting filter coefficients of an adaptive filter; and

coupling a digital video stream together with said first data sequences to said channel as said digital signal.